Donald J. McDonell
University of Ottawa, Canada

Classifications and their Keys

McDonell, D. J.: **Classifications and their keys.**
In: Intern. Classificat. 5 (1978) No. 1, p. 3–7
According to David Wiggins' a classification is acceptable if it is explanatory, and it will be explanatory if it establishes law-like relations between its members. Applying Hempel's formal criteria for classification of Foucault's example, it is shown that it does not meet Wiggins' requirements because this classification is without a key. However, examining some of Paracelsus' classifications it is shown that even though, at first glance they are as strange as Foucault's example, they are explanatory within their system of thought, because the specific system of thought provides the key to understanding them. (Author)

In his preface to *Les mots et les choses*, Michel Foucault tells us that his work was inspired by the following classification of the animals which Borges ascribes to a certain Chinese encyclopaedia:

a) belonging to the Emperor,
b) embalmed,
c) tamed,
d) sucking-pigs,
e) sirens,
f) stray dogs,
g) fabulous,
h) included in the present classification,
i) that shake like fools,
j) innumerable,
k) drawn with a fine camel hair brush,
l) et cetera,
m) having just broken the water pitcher,
n) that from a long way off look like flies.

"In the wonderment of this taxonomy", Foucault writes, "the thing we grasp in one leap, the thing which is demonstrated, by means of fable, as the exotic charm of another system of thought, is the limitation of our own: the stark impossibility of thinking that". What we can't understand is why anyone would want to classify the animals in this way. Why was a classification under these descriptions put together?

We can't understand it because the key which would interpret and explain the classification is missing. Borges has given us the set but he has left out the site where these things could come together, bringing to light the relations binding them up. To attempt to understand the things of the world is to establish an order amongst them and "even for the most naive experience, there is no similitude, no distinction that does not follow from a precise operation and the application of a prior criterion" (1). To say that it is impossible for us to understand the Borges' classification because the key is missing, is to suggest that it was not made possible by any of the criteria we presently use to classify animals. The missing criterion or key makes it impossible for us to understand why anyone would have classified or would have wanted to classify the animals in this way. And without the key this classification is without explanation. The one thing we do grasp in our frustration with the Borges' text is the *difference*: this is not our way of attempting to understand anything.

Being made cogent by discovering the theory that made it possible, the classification would then show that there was more than one way of classifying the animals. A conclusion Foucault wishes to draw. Borges claims that his classification was taken from "a certain Chinese encyclopaedia" which leads Foucault to consider the possibility that there might be "at the other end of the earth a culture that does not distribute the multiplicity of existing things into any of the categories that make it possible for us to name, speak, and think" (2). However, even if we do fail in our attempt to justify this classification, through failure to find a key, in our own culture there may have existed systems of thought so different from our present one that our reaction when confronted with them would not be unlike our reaction to Borges' text, but for which a key could be found that would make it understandable and explanatory. It would not necessarily follow that one was right and one was wrong but simply that it is possible to classify in different ways the things of the world. However David Wiggins in a cryptic remark takes exception to Foucault's interpretation of Borges' classification and in so doing, appears to be questioning the very foundation of Foucault's project as I have described it. Wiggins writes: "It is not really the difficulty of thinking these concepts (for as Foucault himself says they are perfectly well defined), but the difficulty of conceiving that such a taxonomy could make any headway with causality – with the *explanation of anything*" (3).

Wiggins' point is that in order for a classification to be taken seriously it must have explanatory value by our standards. By our standards the type of classification that is serious is one that establishes law-like relations between the members and the class. In each case we know what will count as law-like and what will not. This criticism strikes at the foundation of Foucault's project in the following way. For Foucault a classification should first be evaluated by the lights and the standards of the period when it appeared and not by our present ones. What may seem totally non-explanatory by our standards, or by purely formal criteria, may be perfectly justifiable and understandable if we only knew the background on the basis of which it was established.

1. Formal criteria for classification

By our standards of purely formal criteria Hempel suggests that a serious classification should meet the following conditions. "Generally speaking, a classification of the objects of a given domain D is effected by laying down a set of two or more criteria such that every element of D satisfies exactly one of those criteria. Each criterion determines a certain class, namely, the class of all objects in D which satisfy the criterion. And if indeed each object in D satisfies exactly one of the criteria, then the classes thus determined are mutually exclusive, and they are jointly exhaustive of D." (H. 51) These formal

constraints on a serious classification would have to be met in any system of thought since they indicate the minimal conditions required for anything to count as a classification.

If we now examine the Borges' example in the light of these remarks we will discover that it does not have what is required in order to be taken as a serious classification. In fact we will see that it is not a classification at all. The criterion determines the specific class which is made up of those elements of the general domain satisfying that criterion. The term by which the class is identified must provide directly or indirectly the criterion required to pick out the members of that class. However, in the Borges' example there are at least two classes that do not provide any criteria for selecting members: 'et cetera' and 'innumerable'. It is not that there are no animals that satisfy these criteria, but rather that these terms could not in any classification be counted as criteria for selecting anything. Furthermore, since 'innumerable' means 'incapable of being numbered' this clause would have to be rejected, on the grounds that it is an error to think that there are more animals than there are natural numbers.

The classification could, nevertheless, still be saved even if these two terms 'et cetera' and 'innumerable' have to be rejected as not constituting real classes, save on the condition that the remaining classes jointly exhaust the class of animals. A quick glance shows us that this condition is not satisfied by the Borges' example. For although it does contain all 'tame' animals it would not, as amended, contain any of the wild animals. Thus this classification does not satisfy the condition of being inclusive.

Let us look now at class (h), namely 'included in the present classification'. This class fails to satisfy Hempel's following condition: "And if indeed each object in D satisfies exactly one of the criteria, then the classes thus determined are mutually exclusive." Given class (h) in Borges' example, all the members of the domain of animal satisfy at least two of the criteria and perhaps more. All the members which satisfy criteria named in all the other classes but (h) by that very fact satisfy the criteria indicated in (h) and so are members of that class as well, which leads to a cross-classification. But it is hardly a classification to be taken seriously if there are no grounds for wanting one, as there may be in other classifications, such as speech-sounds.

Why would anyone establish a classification in which not only are three of the classes redundant but the other ten so obviously disparate and unconnected? Wiggins, failing to see anything explanatory in the classification, rejects it out of hand.

2. Natural and artificial classifications

Hempel divides classifications into 'natural' and 'artificial' with the former being those that are scientifically fruitful while the latter are not. The natural classification is one that is based on theoretical attempts to account for the domain in question with the result that the characteristics used to admit a member to a class are associated with clusters of other characteristics. This gives a systematic character to the classification, for example the classification of humans as 'male' and 'female' rather than by their weight. The artificial classification on the other hand is based only on the observation of superficial observable uniformities, for example the classification of people according to their colour. The difference between these two types of classifications can be exemplified in the classification of chemical elements and compounds according to theoretical modes of defining and differentiating them by reference to their atomic and molecular structures, and the classification of the same elements by observational-phenomenal characterization. It is the natural type that has explanatory and predictive value and is therefore most useful to the understanding of the things of the world.

To which of these two types of classification does Borges' example belong? It does not belong to the natural class because it would then have been established on a logical-theoretical basis and so would have been systematic. But a classification in which three out of fifteen classes are unnecessary or unworkable could not have been established in this way. Furthermore, such a classification would make it possible for us a) to see why each of the classes should be a specific class of animals, and b) to see the relation between the various classes. Borges' classification fails on both counts. There are no systematic relations between the classes 'et cetera', 'included in the present classification' and 'innumerable'. And these same three classes do not explain anything: they do not tell us anything about any possible members they might have that would enable us to make predictions of any kind.

Does it then belong to the artificial type? Is it possible that this classification was set up on the basis of observable phenomena alone? But what observable properties do animals manifest which are expressed by the terms 'et cetera', 'innumerable', and 'included in the present classification'? Of these classes none is founded on observable properties of animals. We can conclude that Borges' example does not count as a serious artificial classification, and since we have already excluded any other possibility, our conclusion must be that this example from "a certain Chinese encyclopaedia" cannot count as the classification of anything at all, neither at this end of the earth nor at "the extreme end of the earth". So, evaluated from various points of view, the single conclusion emerges, that this is not a serious classification in any sense, formally or empirically. I examined those conditions which must be satisfied by any classification which is to be taken seriously, that is, which help us make progress with causality, and found it, as did Wiggins, defective.

3. Borges' example is unacceptable

It would appear then that Wiggins is correct and Foucault mistaken in believing that it is only the missing 'site' or key that makes it impossible for us to "think that". The fact is, no key exists that could transform this example into a valid classification of the animals in any system. It is this error that led Foucault mistakenly to consider this example as an indication of the possible existence "at the extreme end of the earth" of a system of thought unlike our own. Foucault is correct in saying that what we grasp in Borges' example is the *difference.* However, the difference is not between two systems of

thought but between our own system and something that does not count as a classification of anything at all.

Foucault is well aware of the fabulous character of the Borges' example and of the dangers of using it to suggest that there might be more than one valid system of thought. Nevertheless, Foucault claims that within our own culture there have existed other systems of thought. One can give an alternative account of different systems of thought which is to treat them as embodying stages in the development of one cogent system of thought. Before accepting such a conclusion we must examine these "other systems" Foucault refers to in order to see why he thinks they are cogent but different from ours. Would every classification that looks as strange as Borges' have to be rejected out of hand? Or is there a key that would show them to be explanatory?

In his book *Les mots et les choses* Foucault describes the Classical age – roughly the seventeenth and eighteenth centuries – as forming a system of thought, different from the Renaissance that preceded it, and the modern period that followed it. Perhaps it was not the culture as a whole that formed a unified system, but rather the set made up of natural history, the analysis of wealth, and general grammar. If those systems are different from ours, it is not, as Foucault puts it, "that reason made progress... but that the order on the basis of which we think today does not have the *same mode of being as that of the Classical thinkers*". I will now examine some of the work produced by thinkers from each of these two "other" periods. What I will show is that we can produce a classification as weird as, and seemingly as non-serious and non-explanatory as Borges', but for which a key can be provided that will show it is explanatory, and deserves to be considered as a serious classification.

4. An example of Renaissance thinking: Paracelsus

The following examples of Renaissance thought are taken from Dr. Philippus Aureolus Theophrastus Bombastus ab Hohenheim, better known as Paracelsus. He was a naturalist concerned primarily with medicine. He believed that it was important to the understanding of disease to know the correspondence between each star and the seat of a particular disease in the body, the "sedes morbi". "Plague, for example, has six classical loci: the region behind each ear, under each axilla and in each inguinal fold. Each of these corresponds to a 'locus planetarum'. Saturn and the moon act on the upper part of the body, in this case on the region behind the ears, Mars and the sun on the axillae, Jupiter and Venus on the inguinal folds." Consumption also implies a correspondence. By "consumption" he means "a progressive atrophy and exsiccation of organs and limbs". It can be explained in cosmological terms: man is part of the earth, as the latter lines by virtue of the gifts it receives from heaven, so does man, the difference being that the gifts received by the earth are visible ones, whereas those given to man are invisible. As long as the astral co-ordination of man is in its normal equilibrium, the microcosmic sun, the heart, will distribute enough warmth and fluid to maintain the nutrition and growth of organs and limbs. If this astral relationship is disturbed, however, limbs, organs or the whole body will suffer from drought and overheating by unbalanced action of the microcosmic sun. "For there is a sun in the body which exsiccates and withdraws damp. If this consumes further and further and nothing is added as if by rain, the sun dries everything up and causes consumption". The disease, therefore, is dependent on the sun. It is due to faulty reception and use of nourishment whose "guidance" to the right places depends on celestial concordance, for the nourishment is consumed by the microcosmic sun. The cure must aim at providing additional damp to feed the microcosmic sun. Man cannot force heaven to provide this, but can "make another heaven". Hence the arcana, "For arcanum is as much as a powerful heaven in the physician's hand . . . he must sow water that grows in man as grass grows in the field so that heaven stands in our hand: for this is the arcanum that removes consumption and is the heaven in the remedy which gives rain and dew . . ." The desiccation of limbs and organs indicates that man has fallen "into the sphere of Saturn and lost his old heaven, his ascendant, his constellation, and lives in Saturn which attracts his nature and his complexion and rejoices in consuming him and leading him to where the sun is hottest, as if he were a joint to be roasted, but at last freezes him. "God, however, has anticipated the treachery of some malignant stars . . . and made a further heaven by creating the physician and the remedy from the earth, and heaven above must help earth to make the lower heaven grow. Who could withstand the upper heaven, were there no lower heaven? Thus the lower heaven is the benevolent one which no wise man despises." Drugs and their action are bound up with the astra but the relation is one of correspondence and not of causation. Thus the astra does the work of the physician and so "you should not call a drug cold or hot or humid or dry, but should say: this is Saturn, this Mars, this Venus, this the Pole". The doctor should know how to bring about a concordance between "the astral Mars and the grown Mars" (i.e., the herb used as a remedy).

5. Classifications in Paracelsus' system

Given this information of correspondance between disease and the stars we could classify diseases in the following way:

a) caused by the action of Saturn and the moon on the upper part of the body;
b) caused by the action of Mars and the sun on the axillae;
c) caused by the action of Jupiter and Venus on the inguinal folds;
d) caused by the action of the sun alone.

I turn now to a second example, that of the calssification of wounds. Wounds may be graded in relation to the stars. Wounds contracted under Gemini, Virgo, Capricorn are the most unlucky. Similarly, the planets can be graded according to their evil influence on wounds. Finally, the astral influence varies according to the seat of the wound. A wound below the belt contracted when the moon is new is unluckier then one contracted when the moon is full. A wound above the belt is more favourable when contracted before full moon than after. A wound received after midday, at night, in March or April is less favourable than one received before midday, in daytime, and in any other month. This correspondence

between disease, stars and times leads to the following classification of wounds. There are wounds that are:

a) contracted under Gemini, Virgo, and Capricorn;
b) contracted when the moon is new;
c) contracted when the moon is full;
d) contracted at midnight in the spring.

As a final point I shall look at the classification of medicaments.

This influence of the stars can be made use of in medicine. The "Ars Magica" teaches how to capture "celestial seeds" which are planted in the body of the earth and in stones and which are called "Gamahi". For heaven can smite a stone, just as it smites man by sending down a pentilence. The "influence" shot into a stone can be either harmful or beneficial in disease. It is our task to prepare or to find the appropriate "Gamahi" for an individual disease. Such "influential stones" marked on the surface by a bow or sword would make amulets against shot and stab wounds. A herb reveals by a certain configuration or the colour of its leaves, flowers or roots an affinity with a certain star, organ or disease. "The root Satyrion (orchid) is it not formed like a man's private parts? Hence it promises through magic and has been found by magic to restore manhood and sexual desire to man. Also the thistle – do not its bones prick like needles? Hence there is no better remedy against internal stitches." Eye bright (Eufragia) shows the image – signature – of eyes. Iris (dactyletus, aristolochia) cures cancer, for "its image locates itself in the body at the place to which it belongs by form". Medicaments can be classified as:

a) those that are formed like man's private parts;
b) those that look like needles;
c) those that have the shape of the eye;
d) those that are Iris-shaped.

It is impossible to read these lines without being impressed by the mixture of astrology, magic, folk tales, and metaphysics. The question is are these classifications be rejected out of hand in the way Borges' was? It is hardly necessary to go into a detailed analysis to show that taken independently and out of context they do not meet Wiggins' requirement for a serious system of thought, namely, being explanatory. Although they do not contain the chaos of Borges' example, it is quite difficult to see how, without the explanations, these classifications alone would help us to understand anything. For example that one can come to know the orchid's root returns secual desire to man because it has the shape of his private parts, would not imply a law of any kind without the detailed background relating man to the universe. It is this background or key which tells us why it was believed that curative powers were related to shape. By our standards or lights, we would ask how many other plants ressemble man's private parts in a more precise way and have no curative powers? Or why is shape more important than colour or size? But the key shows why by their lights they classified medicaments the way they did, and for this reason can't be rejected out of hand as not explaining anything. The same thing can be asked about the curative powers of the thistle: there are many other plants and herbs which prick, why do they not have the same effect on internal stitches? When we read more closely we discover that the similarity of shape was the criterion used to guide the process of trial and error in finding medicaments. Paracelsus says: "Hence it promises through magic and has been found by magic to restore manhood and sexual desire". In other words it was through experience that such wonderful powers of Satyrion were discovered, and shape is the theory that provides the classification. It is this key that marks the difference between the Paracelsus classification and the one presented by Borges. Wiggins says that judging by our standards we can reject out of hand a classification as not contributing to our understanding of causality. But we can't do this with the Paracelsus examples because they are rudimentary law-like classifications.

6. The key to Paracelsus' classifications

I will now look at the key, or background that will show that they are law-like classifications. You should not ask are these explanatory by our standards, but by what standards of theirs' could they have thought such classifications were useful. In the Borges case we don't know, but in Paracelsus' classifications we do have the answers.

The system, which according to Foucault ended about the middle of the seventeenth century, was composed essentially of the following two elements.

1. The notion of *resemblance* which meant that knowledge consisted in discovering a similitude between things. These similitudes were established in accordance with four basic figures.

a) *Convenientia.* By this figure things are brought together by the proximity of the places they occupy. This implies that there are similar properties in those things occupying related places. For example, there are as many fish in the water as there are on earth animals and objects produced by man and nature. There as many things in the heavens as there are on the earth and in the waters combined.

b) *Aemulatio.* By this figure things are freed from the law of spatial proximity and are brought together by the way they reflect each other. The face is a reflection of the heavens, and man's intelligence is a weak reflection of God's wisdom. One of the two elements caught in the reflection may influence the other as the stars influence the plants of the earth.

c) *Analogy.* The difference between this figure and the first two is that this one goes beyond the massive visible similitudes of things themselves to the similarities of relations. For example the relation between the stars and heavens is similar to the relation between the plants and the earth, or living things and the globe. Man has a privileged position since all analogies can be found in him. He is like the heavens, the earth, the animals, the plants, the metals, and the storms.

d) *Sympathy–Antipathy.* Sympathy is a free figure that can bring any two things together at any time of any distance. Roses having been used at a burial ceremony will make sad anyone who smells them. It is the principle of mobility. For example it attracts heavy things to the weightlessness of ether. Sympathy also transforms things and assimilates reducing everything to the one same thing. Thus *antipathy* is required to prevent such assimilation and so despite the attraction of sympathy all things remain distinctly what they are. For example it is believed that plants hate each other: the

olive and the vine hate the cabbage, the cucumber hates the olive, etc. It is these two figures that make it possible for the basic elements – water, air, fire, and earth – to be combined and separated without losing their identity.

2. A second major element in the system was a theory of *signatures.* The signatures were marks or signs, left on things by the creator himself, to let man know where the hidden resemblances were. For example, as Paracelsus said, "did the root of the Satyrion not have the form of man's private parts?" Every resemblance has its mark, and it is by deciphering these marks that all the resemblances in the world become visible. But if the resemclance between two things is one of sympathy how will the sign of sympathy be recognized? By an analogy between the signature and the resemblance signified. Sympathy is signaled by analogy. Analogies on the other hand, are signaled by *aemulatio* and sympathy, and *aemulatio* is caught in the mark of analogy or *convenientia*. Finally *convenientia* is signed by sympathy.
The basis for all these signatures is *resemblance*: they are signs in as much as they resemble that which they signify which is another resemblance.

Another necessary feature of a system based in part on resemblance was the use of the category 'microcosm–macrocosm'. To say that knowledge was based on the accumulation of resemblances is not to provide a discovery procedure for knowledge. This category is necessary to determine what could count as knowledge and guarantee it once discovered. It is this category that is the source of the often quoted remark that there can be only as many planets as there are openings in the human body. The same two elements, resemblance and signature, according to Foucault, account for the presence of magic and erudition as required ways of coming to know things. Belief in the powers of magic derived from the belief that knowledge consisted in interpreting visible signs. These signs resembled the things they signified. Thus to operate on signs was also to affect things signified. For example, according to the theory, to use the name of the animal caused the animal to react. Erudition, which is the interpretation of texts, was not unlike magic since the texts to be interpreted were not unlike the signatures deposited in nature itself.

Here we have the basic elements of a system which up to the Classical Age determined the way individuals, like Paracelsus, attempted to understand the things of the world. Their descriptions, classifications, explanations, and even their problems appeared as they did because grounding them was the system. To show how: the essential of the system is the belief that whatever happened in the universe had a corresponding effect in man. Secondly that such correspondences were discovered through clearly observable and not so clearly observable analogies – signatures and resemblances. These beliefs clearly ground the medical science of the day. It is only a short step from beliefs embodied in the system to a classification of diseases based on the stars, a classification of wounds based on the planets, and a classification of medicaments based on the shape of plants and herbs.

7. Paracelsus' classifications are explanatory

How does the existence of a system and a classification that it grounds stand up to Wiggins' remark that to be cogent a classification must help us to make progress with causality? Granted that the existence of such a system of thought makes the classifications we mentioned intelligible, does it make them explanatory, that is are the relations established law-like? Unless we can say yes to this, we have made these classifications intelligible, which we were not able to do with the Borges' example, but we have done no more. They would still have to be rejected as not counting as serious classifications, though not out of hand. Is there anything in the system that looks as though it might count as providing an explanation for anything? It seems to me that there is: when we nowadays ask why the stone falls to the earth we answer because it obeys the law of gravity. Paracelsus' answer was that by sympathy heavy things were attracted to the heaviness of the earth. What causes the sunflower to change directions during the day? The sympathy which exists between. the sun and the flower. Here we have several relations that are verified by experience. Is this not sufficient to call these relations law-like? After all 'law-like' does not mean 'true', it just means that it could be true by having the form of a law of nature. One might object that these are rather primitive causal relations reflecting what appears to be a human experience. Certainly the explanations provided are not very scientific by our standards and seem more mythical then scientific. Nevertheless, they do count as explanations.
We looked at Borges' example of the classification of animals and, like Wiggins, we rejected it because it cannot be made intelligible, and if it cannot be made intelligible it cannot be explanatory. We then looked at examples of sixteenth century classifications of medical phenomena. We came up with classifications that were just as weird as Borges' but which could be made intelligible. And by making them intelligible they were shown to be explanatory, because making them intelligible is to establish relations between a classification and a theory.

There are several conclusions that I want to draw out of this. The first is that a classification never exists in a void and cannot be rejected out of hand. Further, classifications are not rejected because they are not explanatory but because the theory that grounded them has been rejected or replaced. This is what happened, for example, when the Classical Age with its system, founded essentially on representation, replaced the Renaissance system which was founded on resemblance. It is also in the light of the grounding systems that various stages of a classification have to be understood. Whether or not there is progress made from one grounding system to another, and how such progress can be evaluated is another, yet to be examined, question.

References and Notes:

(1) Foucault, M.: Les mots et les choses. Paris: Gallimard 1966. (2) See (1) p. 11 (3) Wiggins, D.: Essentialism, continuity and identity. In: Synthese 23 (1974) p. 358, note 43 (4) Hempel, C. G.: Fundamentals of concept formation in empirical science. Chicago: The University of Chicago Press 1952. p. 51 (5) See (1) p. 13 (6) Paracelsus: Über die Pest. In: Huser vol. I, p. 326 (quoted by W. Pagel in Paracelsus: An introduction to philosophical medicine in the era of the Renaissance. Basel: S. Karger 1958. p. 68) (7) Paracelsus: Aridura. In: Huser, vol. 1, p. 518–520 (quoted by W. Pagel – see (6), p. 68) (8) See (7), p. 69 (9) Paracelsus: De imaginibus. In: ed. Sudhoff, vol. XIII, p. 378 (quoted by Pagel – see (6), p. 149)